Sun Secure Global Desktop 4.5 Gateway Administration Guide

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Contents

Preface

The *Sun Secure Global Desktop 4.5 Gateway Administration Guide* provides instructions for installing, configuring, and operating the Sun Secure Global Desktop Gateway (SGD Gateway). The document is written for system administrators.

How This Book Is Organized

Chapter 1 describes how to install the SGD Gateway.

Chapter 2 describes how to configure the SGD Gateway for your network.

Appendix A describes the architecture of the SGD Gateway.

Appendix B describes how to configure and control the SGD Gateway from the command line.

Appendix C covers advanced configuration of the SGD Gateway, including how to configure Sun Java System Access Manager for use with the SGD Gateway, and how to configure the reflection service of the SGD Gateway.

Appendix D includes troubleshooting information, to help you to diagnose and fix problems with the SGD Gateway.

Using UNIX Commands

This document might not contain information on basic UNIX® commands and procedures such as shutting down the system, booting the system, and configuring devices. Refer to the following for this information:

- Software documentation that you received with your system
- Solaris™ Operating System documentation, which is at

  `http://docs.sun.com`

This document does, however, contain information about specific SGD commands.

Shell Prompts

Shell	Prompt
C shell	*machine-name*`%`
C shell superuser	*machine-name*`#`
Bourne shell and Korn shell	`$`
Bourne shell and Korn shell superuser	`#`

Typographic Conventions

Typeface	Meaning	Examples
`AaBbCc123`	The names of commands, files, and directories; on-screen computer output	Edit your `.login` file. Use `ls -a` to list all files. `% You have mail.`

`AaBbCc123`	What you type, when contrasted with on-screen computer output	`%` **`su`**
		`Password:`

AaBbCc123	Book titles, new words or terms, words to be emphasized. Replace command-line variables with real names or values.	Read Chapter 6 in the *User's Guide*. These are called *class* options. To delete a file, type **`rm`** *filename*.

Note – Characters display differently depending on browser settings. If characters do not display correctly, change the character encoding in your browser to Unicode UTF-8.

Related Documentation

The following table lists the documentation for this product. The online documentation is available at:

```
http://docs.sun.com/app/docs/coll/1706.3
```

Application	Title	Part Number	Format	Location
Release Notes	*Sun Secure Global Desktop 4.5 Release Notes*	820-6687-10	HTML PDF	Online Software CD and online
Installation	*Sun Secure Global Desktop 4.5 Installation Guide*	820-6688-10	HTML PDF	Online Software CD and online
Administration	*Sun Secure Global Desktop 4.5 Administration Guide*	820-6689-10	HTML PDF	Online
User	*Sun Secure Global Desktop 4.5 User Guide*	820-6690-10	HTML PDF	Online

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Sun Secure Global Desktop 4.5 Gateway Administration Guide, part number 820-6691-10.

CHAPTER 1

Installing the SGD Gateway

Following a brief introduction to the SGD Gateway, this chapter describes how to install the SGD Gateway software. The chapter also includes details of system requirements for the SGD Gateway.

This chapter includes the following topics:

- "About the SGD Gateway" on page 1
- "System Requirements" on page 2
- "Performing the Installation" on page 3

About the SGD Gateway

The SGD Gateway is a proxy server designed to be deployed in front of an SGD array in a demilitarized zone (DMZ). This enables the SGD array to be located on the internal network of an organization, so the network addresses of the SGD servers in the array are not exposed. Additionally, all connections can be authenticated in the DMZ before any connections are made to the SGD servers in the array.

Using the SGD Gateway is an alternative to running your SGD servers with firewall traversal, also called firewall forwarding.

The SGD Gateway manages load balancing of Hypertext Transfer Protocol (HTTP) connections, so you do not need to use the load balancing JavaServer page (JSP) included with SGD.

System Requirements

The supported installation platforms for the *SGD Gateway host* are shown in the following table.

Operating System	Supported Versions
Solaris™ Operating System (Solaris OS) on SPARC platforms	10
Solaris OS on x86 platforms	10
OpenSolaris on x86 platforms	Latest version
Red Hat Enterprise Linux (Intel x86 32-bit)	5
SUSE Linux Enterprise Server (Intel x86 32-bit)	10

The following requirements apply for the *SGD servers* used with the SGD Gateway:

- **Secure mode.** The SGD servers used with the SGD Gateway must be running in secure mode. Firewall traversal is not supported, so you cannot use the `tarantella security enable` command to configure secure mode automatically.

  See "Setting Up Secure Client Connections (Manual Configuration)" in Chapter 1 of the *Sun Secure Global Desktop 4.41 Administration Guide* for details of how to secure an SGD server.

  Firewall traversal is covered in "Using Firewall Traversal" in Chapter 1 of the *Sun Secure Global Desktop 4.41 Administration Guide*.
- **Integrated mode.** SGD Clients must not be configured to access the SGD servers in Integrated mode.
- **SGD version.** The SGD servers must be running version 4.50 of SGD.
- **Clock synchronization.** It is important that the system clocks on the SGD servers and the SGD Gateway are in synchronization. Use Network Time Protocol (NTP) software, or the `rdate` command, to ensure that the clocks are synchronized.

For more information on SGD server system requirements, see the *Sun Secure Global Desktop 4.41 Installation Guide*

.

Known Issues

The following are the known issues with this release of the SGD Gateway.

Reference	Description
6736681	Issues with installation package and SGD Gateway commands
6747904	Unable to access SGD Administration Console
6750985	Proxy errors reported in webtop frames
6756201	`gateway-plaintext.xml` configuration file fails to route HTTP traffic
6756251	Issues with `gateway status` command
6758689	Potentially Unsafe Connection dialog shown after logging in to SGD
6759146	SGD server array names stored on the client device
6759214	Help and usage information for `gateway cert export` command
6759253	SGD Gateway certificate management commands are inconsistent with security commands used for SGD
6762531	Some SGD Gateway configuration files are readable by non-Administrators
6762887	JVM tuning not available using command line

Performing the Installation

On Solaris OS platforms, install the SGD Gateway with the `pkgadd` command.

On Linux platforms, install the SGD Gateway with the `rpm` command.

By default, SGD is installed in the `/opt/SUNWsgdg` directory. You can change the installation directory, as follows:

- **Solaris OS platforms** – The installation program asks you for the installation directory when you install the software
- **Linux platforms** – You can choose a different installation directory, by using the `--prefix` option with the `rpm` command when you install the software

▼ How To Install the SGD Gateway

1. **Save the SGD Gateway package to a temporary directory on the host.**

   If you are installing from the CD-ROM, the package is in the `gateway` directory.

   Alternatively, download the installation program from an SGD Web Server at `http://`*server.example.com*, where *server.example.com* is the name of an SGD server. When the SGD Web Server Welcome Page is displayed, click Install the Sun Secure Global Desktop Gateway.

   These are the package files:

   - `SUNWsgdg-`*version*`.sol-x86.pkg` for Solaris OS on x86 platforms
   - `SUNWsgdg-`*version*`.sol-sparc.pkg` for Solaris OS on SPARC technology platforms
   - `SUNWsgdg-`*version*`.i386.rpm` on Linux platforms

   where *version* is the SGD Gateway version number.

2. **Log in as superuser (root) on the host.**

3. **Install the SGD Gateway.**

   If the package file is compressed, you must expand it before installing.

   To install on Solaris OS on x86 platforms:

```
# pkgadd -d /tempdir/SUNWsgdg-version.sol-x86.pkg
```

   To install on Solaris OS on SPARC technology platforms:

```
# pkgadd -d /tempdir/SUNWsgdg-version.sol-sparc.pkg
```

Note – On Solaris OS platforms, if the installation fails with a `pwd: cannot determine current directory!` error message, change to the /*tempdir* directory and try again.

   To install on Linux platforms:

```
# rpm -Uvh /tempdir/SUNWsgdg-version.i386.rpm
```

4. **Verify that the SGD Gateway package is registered in the package database.**

   On Solaris OS platforms:

```
# pkginfo | grep -i SUNWsgdg
```

   On Linux platforms:

```
# rpm -qa | grep -i SUNWsgdg
```

5. **Run the SGD Gateway setup program.**

```
# /opt/SUNWsgdg/bin/gateway setup
```

   The SGD Gateway setup program presents the following settings that you can accept or change:

   - **SGD Gateway port settings.** The interface and port used by the SGD Gateway for incoming connections. By default, the SGD Gateway listens on port 443 on all interfaces.
   - **Network entry point.** The Internet Protocol (IP) address, or Domain Name System (DNS) name, and the port that client devices use to connect to the SGD Gateway. This is not always the same as the address of the SGD Gateway. Depending on the configuration of your network, this can be the address of a load balancer or other external device.

     For example, if users connect directly to an SGD Gateway at `gateway1.example.com`, type `gateway1.example.com:443` for the network entry point.

     If users connect to the SGD Gateway through a load balancer at `lb.example.com`, type `lb.example.com:443` for the network entry point.
   - **Secure connections.** Whether to secure the connections between the SGD Gateway and the SGD servers in the array. By default, the SGD Gateway uses secure connections. To use secure connections, the SGD servers in the array must be running in secure mode.

Note – These settings can be changed later, by using the `gateway config create` command. See "How to Configure the Ports and Connections for the SGD Gateway" on page 12.

After installing the software, you must perform additional configuration of the SGD Gateway. See Chapter 2 for details of what you need to do.

CHAPTER 2

Configuring the SGD Gateway

This chapter describes how to configure the SGD Gateway for typical deployment scenarios. How to start and stop the SGD Gateway is also covered in this chapter, along with instructions on how to remove the SGD Gateway software.

This chapter includes the following topics:

- "Deploying the SGD Gateway" on page 7
- "SGD Gateway Configuration Tasks" on page 12
- "Controlling the SGD Gateway" on page 17
- "Removing the SGD Gateway" on page 19

Deploying the SGD Gateway

This section describes the following SGD Gateway deployment scenarios:

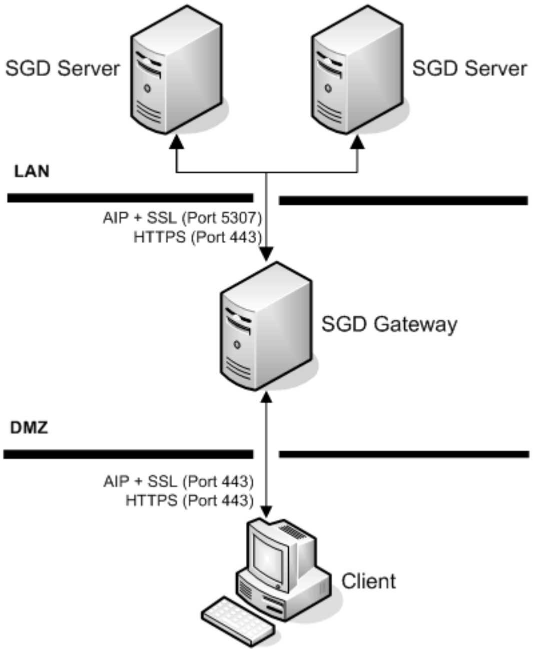
- "Basic Deployment" on page 7
- "Load-Balanced Deployment" on page 9

Basic Deployment

This section describes the configuration tasks for a basic deployment of the SGD Gateway.

A basic deployment uses a single SGD Gateway, as shown in FIGURE 2-1.

FIGURE 2-1 Basic Deployment Using a Single SGD Gateway



Configuring a basic deployment involves configuring the connections shown in TABLE 2-1.

TABLE 2-1 Connections For a Basic Deployment of the SGD Gateway

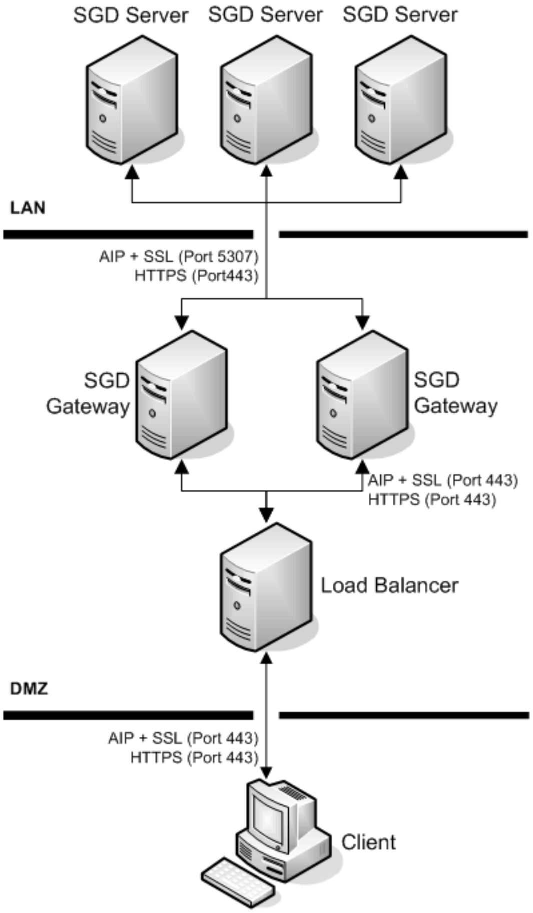
Connection	Configuration Steps
Client device to SGD Gateway	1. Configure the ports and connections used by the SGD Gateway. You configured these settings when you installed the SGD Gateway. See "How to Configure the Ports and Connections for the SGD Gateway" on page 12 if you want to change the configuration of the SGD Gateway. 2. On the SGD Gateway, install a Secure Sockets Layer (SSL) certificate for client connections. See "How to Install an SSL Certificate for Client Connections Into the Client Keystore" on page 13.
SGD Gateway to SGD servers	1. Enable SGD security services for the array. The SGD servers must be running in secure mode. Firewall traversal is not supported. See "Setting Up Secure Client Connections (Manual Configuration)" in Chapter 1 of the *Sun Secure Global Desktop 4.41 Administration Guide* for details of how to do this. 2. On the SGD Gateway, install security certificates for the SGD servers. Use the `gateway server` command to import CA certificates and SSL certificates for the SGD servers in the array into the SGD Gateway keystore. See "How to Install SGD Server Certificates" on page 14. 3. Set up the SGD servers in the array to use the SGD Gateway. Install the SGD Gateway certificate on the SGD array, and use the `tarantella gateway add` command to register the SGD Gateway with the SGD array. See "How to Install SGD Gateway Certificates on the SGD Array" on page 15. 4. Configure the SGD Client connections that use the SGD Gateway. See "How to Configure SGD Client Connections" on page 16.

Load-Balanced Deployment

This section describes the configuration tasks for a load-balanced deployment of SGD Gateway.

A load-balanced deployment uses multiple SGD Gateways and a load balancer as the network entry point, as shown in FIGURE 2-2.

FIGURE 2-2 Network Deployment Using Multiple SGD Gateways and a Load Balancer



Configuring a load-balanced deployment involves configuring the connections shown in TABLE 2-1.

TABLE 2-2 Connections For a Load-Balanced Deployment of the SGD Gateway

Connection	Configuration tasks
Client device to load balancer	1. Enable incoming connections from client devices. Typically, this uses TCP port 443. See your load balancer documentation for details of how to do this. 2. (Optional) On the load balancer, install the SSL certificate used by the SGD Gateways for client connections. See your load balancer documentation for details of how to do this.
Load balancer to SGD Gateway	1. Configure your load balancer to forward connections to the SGD Gateway. See your load balancer documentation for details of how to do this. 2. Configure the ports and connections used by the SGD Gateway. Set the network entry point to the address of the load balancer. You configured these settings when you installed the SGD Gateway. See "How to Configure the Ports and Connections for the SGD Gateway" on page 12 if you want to change the configuration of the SGD Gateway. 3. On each SGD Gateway, install an SSL certificate for client connections. See "How to Install an SSL Certificate for Client Connections Into the Client Keystore" on page 13.
SGD Gateway to SGD servers	1. Enable SGD security services for the SGD array. The SGD servers must be running in secure mode. Firewall traversal is not supported. See "Setting Up Secure Client Connections (Manual Configuration)" in Chapter 1 of the *Sun Secure Global Desktop 4.41 Administration Guide* for details of how to do this. 2. On the SGD Gateway, install security certificates for the SGD servers. Use the `gateway server` command to import CA certificates and SSL certificates for the SGD servers in the array into the SGD Gateway keystore. See "How to Install SGD Server Certificates" on page 14. 3. Set up the SGD servers in the array to use the SGD Gateways. Install SGD Gateway certificates on the SGD array, and use the `tarantella gateway add` command to register the SGD Gateways with the SGD array. See "How to Install SGD Gateway Certificates on the SGD Array" on page 15. 4. Configure the SGD Client connections that use the SGD Gateways. See "How to Configure SGD Client Connections" on page 16.

SGD Gateway Configuration Tasks

This section includes instructions for configuring the connections used by the SGD Gateway.

The following configuration tasks are described:

- "Client Device to SGD Gateway Connections" on page 12
- "SGD Gateway to SGD Server Connections" on page 14
- "Client Device to Load Balancer Connections" on page 17
- "Load Balancer to SGD Gateway Connections" on page 17

Client Device to SGD Gateway Connections

Configuring connections between the client device and an SGD Gateway involves the following configuration tasks:

1. (Optional) Configure the ports and connections used by the SGD Gateway.

   You configure these settings when you install the SGD Gateway.

   To change these settings, see "How to Configure the Ports and Connections for the SGD Gateway" on page 12.

2. On the SGD Gateway, install an SSL certificate for client connections.

   See "How to Install an SSL Certificate for Client Connections Into the Client Keystore" on page 13.

▼ How to Configure the Ports and Connections for the SGD Gateway

You only need to use this procedure if you want to change the settings you made during installation of the SGD Gateway.

1. **Log in as superuser (root) on the SGD Gateway host.**

2. **Run the** `gateway config create` **command.**

```
# /opt/SUNWsgdg/bin/gateway config create
```

   Answer the on-screen questions, to configure the following:

- **SGD Gateway port settings.** The interface and port used by the SGD Gateway for incoming connections.
- **Network entry point.** The IP address, or DNS name, and port that client devices use to connect to the SGD Gateway. This is not always the same as the address of the SGD Gateway. Depending on the configuration of your network, this can be the address of a load balancer or other external device.
- **Secure connections.** Whether to secure the connections between the SGD Gateway and the SGD servers in the array. To use secure connections, the SGD servers in the array must be running in secure mode.

3. **Save the connection and port settings.**

   The SGD Gateway is configured using the settings you entered.

▼ How to Install an SSL Certificate for Client Connections Into the Client Keystore

The SSL certificate that the SGD Gateway uses for client connections is called the SGD Gateway SSL certificate. The SSL certificate is stored in the client keystore, `/opt/SUNWsgdg/proxy/etc/keystore.client`.

By default, the SGD Gateway uses a *self-signed* SGD Gateway SSL certificate for client connections, but you can replace the self-signed SSL certificate with a certificate signed by a certificate authority (CA).

The following procedure assumes you have an SSL certificate signed by a CA.

The certificate you install must be in Privacy Enhanced Mail (PEM) format, and the corresponding private key must be in PKCS#8 format.

1. **Log in as superuser (root) on the SGD Gateway host.**

2. **Copy the SSL certificate and the corresponding private key to the SGD Gateway host.**

3. **Import the SSL certificate and private key into the client keystore.**

   Use the `gateway sslkey import` command, as follows:

```
# /opt/SUNWsgdg/bin/gateway sslkey import \
--keyfile temp.key \
--keyalg RSA \
--certfile example.com.pem
```

   Here, the certificate file *example.com.pem* and the corresponding RSA-encoded private key, *temp.key*, are imported into the client keystore.

   The existing self-signed SSL certificate in the client keystore is overwritten.

4. **Restart the SGD Gateway.**

Note – Restarting the SGD Gateway disconnects all user sessions and application sessions that are running through the SGD Gateway.

On the SGD Gateway host, run the following command:

```
# /opt/SUNWsgdg/bin/gateway restart
```

SGD Gateway to SGD Server Connections

The connections between an SGD Gateway and the SGD servers in the array use certificates for mutual authorization. Configuring these connections involves the following configuration tasks:

1. Install SGD server certificates on the SGD Gateway.

   See "How to Install SGD Server Certificates" on page 14.

2. Install the SGD Gateway certificate on the SGD array.

   See "How to Install SGD Gateway Certificates on the SGD Array" on page 15.

3. Configure SGD Client connections for the SGD Gateway.

   See "How to Configure SGD Client Connections" on page 16.

▼ How to Install SGD Server Certificates

To use this procedure, the SGD servers in the array must be running in secure mode.

Note – Do not use the `tarantella security enable` command to configure secure connections automatically for the SGD servers in this array. This command turns on firewall forwarding, which is not supported by the SGD Gateway. Instead, configure secure connections manually using the `tarantella security start` command.

See "Setting Up Secure Client Connections (Manual Configuration)" in Chapter 1 of the *Sun Secure Global Desktop 4.41 Administration Guide* for more information about how to enable security services on an SGD server.

Repeat the following procedure for each SGD server in the array.

1. **Log in as superuser (root) on the SGD host.**

2. **Copy the CA certificate from the SGD server to the SGD Gateway keystore directory.**

   The CA certificate for an SGD server is at `/opt/tarantella/var/info/certs/PeerCAcert.pem` on the SGD host.

   The SGD Gateway keystore directory is `/opt/SUNWsgdg/proxy/etc`.

3. **Copy the SSL certificate from the SGD server to the SGD Gateway keystore directory.**

   The SSL certificate for an SGD server running in secure mode is at `/opt/tarantella/var/tsp/cert.pem` on the SGD host.

   The SGD Gateway keystore directory is `/opt/SUNWsgdg/proxy/etc`.

4. **Log in as superuser (root) on the SGD Gateway host.**

5. **Import the certificates into the SGD Gateway keystore.**

```
# /opt/SUNWsgdg/bin/gateway server add --server sgd-server1 \
--certfile /opt/SUNWsgdg/proxy/etc/PeerCAcert.pem --url https://sgd1.example.com \
--ssl-certfile /opt/SUNWsgdg/proxy/etc/cert.pem
```

   The `--server` option defines the alias names used when storing the certificates in the keystore. In this example, the CA certificate is stored using an alias of *sgd-server1*, the SSL certificate is stored using an alias of *sgd-server1-ssl*.

   https://sgd1.example.com is the Uniform Resource Locator (URL) of the SGD Web Server.

6. **Restart the SGD Gateway.**

Note – Restarting the SGD Gateway disconnects all user sessions and application sessions that are running through the SGD Gateway.

   On the SGD Gateway host, run the following command:

```
# /opt/SUNWsgdg/bin/gateway restart
```

▼ How to Install SGD Gateway Certificates on the SGD Array

Repeat the following procedure for each SGD Gateway.

1. **Export the SGD Gateway certificate.**

   a. **Log in as superuser (root) on the SGD Gateway host.**

b. Export the SGD Gateway certificate from the SGD Gateway keystore.

Use the `gateway cert export` command, as follows:

```
# /opt/SUNWsgdg/bin/gateway cert export -certfile gateway1.pem
```

The certificate is exported to the file *gateway1.pem*.

c. Copy the certificate to the `/opt/tarantella/var/tsp` **directory on the primary SGD server in the array.**

2. Register the SGD Gateway with the SGD array.

a. On the primary SGD server, log in as superuser (root).

b. Import the SGD Gateway certificate.

```
# tarantella gateway add --name sgd-gateway1 \
--certfile /opt/tarantella/var/tsp/gateway1.pem
```

where *sgd-gateway1* is a name used by SGD to identify the SGD Gateway, and *gateway1.pem* is the SGD Gateway certificate file name.

To register multiple SGD Gateways at the same time, use the `--file` option of the `tarantella gateway add` command. See "The `tarantella gateway` Command" on page 49 for more details.

Configuration changes made using `tarantella gateway add` are replicated to the other SGD servers in the array.

▼ How to Configure SGD Client Connections

- **Configure the SGD Client connections that use the SGD Gateway.**

On the primary SGD server, set the `--security-gateway` global attribute to define which SGD Clients can use the SGD Gateway, based on their Internet Protocol (IP) address or Domain Name System (DNS) name.

To specify that all SGD Client connections are routed through TCP port 443 of a single SGD Gateway `gateway1.example.com`, use the following command:

```
# tarantella config edit --security-gateway \
"*:sgdg:gateway1.example.com:443"
```

To specify that all SGD Client connections are routed through TCP port 443 of an external load balancer `lb.example.com`, use the following command:

```
# tarantella config edit --security-gateway \
"*:sgdg:lb.example.com:443"
```

Note – Changes to the `--security-gateway` attribute affect all SGD servers in the array. The changes only apply to new user sessions.

See "The `--security-gateway` Attribute" on page 53 for more details about how to use the `--security-gateway` attribute to define multiple SGD Client connection filters.

Client Device to Load Balancer Connections

Configuring connections between the client device and an external load balancer involves the following configuration tasks:

1. Configure the load balancer to accept connections from client devices.

   See your load balancer documentation for details of how to do this.

2. (Optional) Install the SSL certificate for the SGD Gateway on to the load balancer.

   See your load balancer documentation for details of how to do this.

Load Balancer to SGD Gateway Connections

Configuring connections between an external load balancer and the SGD Gateway involves the following configuration tasks:

1. Configure the ports and connections used by the SGD Gateway.

   See "How to Configure the Ports and Connections for the SGD Gateway" on page 12.

2. On the SGD Gateway, install an SSL certificate for incoming client connections.

   See "How to Install an SSL Certificate for Client Connections Into the Client Keystore" on page 13.

Controlling the SGD Gateway

This section describes how to control the SGD gateway. The following tasks are described:

- Starting the SGD Gateway
- Stopping the SGD Gateway

- Restarting the SGD Gateway

Starting the SGD Gateway

To start the SGD Gateway, use the following command:

```
# /opt/SUNWsgdg/bin/gateway start
```

Stopping the SGD Gateway

Caution – Stopping the SGD Gateway disconnects all user sessions and application sessions that are running through the SGD Gateway. This means that application data can be lost if the SGD Gateway is stopped unexpectedly.

To stop the SGD Gateway, use the following command:

```
# /opt/SUNWsgdg/bin/gateway stop
```

When you use the `gateway stop` command a warning message is displayed, prompting you to confirm that you want to stop the SGD Gateway. Use the `--force` option of the `gateway stop` command if you do not want to display this message.

Note – If the SGD Gateway is stopped, users from outside your network cannot connect to SGD using the SGD Gateway. Client devices that have been enabled using the `--security-gateway` attribute to access SGD directly without going through the SGD Gateway, can still access SGD. See "The --`security-gateway` Attribute" on page 53.

Restarting the SGD Gateway

Caution – Restarting the SGD Gateway disconnects all user sessions and application sessions that are running through the SGD Gateway. This means that application data can be lost if the SGD Gateway is restarted unexpectedly.

To restart the SGD Gateway, use the following command:

```
# /opt/SUNWsgdg/bin/gateway restart
```

When you use the `gateway restart` command a warning message is displayed, prompting you to confirm that you want to stop the SGD Gateway. Use the `--force` option of the `gateway restart` command if you do not want to display this message.

Removing the SGD Gateway

To remove the SGD Gateway, you remove the software installed on the SGD Gateway host.

▼ How To Remove the SGD Gateway

1. **Log in as superuser (root) on the SGD Gateway host.**
2. **Uninstall the SGD Gateway.**

   Run the following command:

```
# /opt/SUNWsgdg/bin/gateway uninstall
```

   A warning message is displayed, prompting you to confirm that you want to stop the SGD Gateway.

Caution – The `gateway uninstall` command is the only supported method of removing the SGD Gateway. Do not use the `pkgrm` or `rpm` commands directly to remove the SGD Gateway.

3. **Change the SGD Client routing configuration for the SGD array.**

   a. **Log in as superuser (root) on the primary SGD server.**

   b. **Edit the `--security-gateway` attribute for the SGD array.**

   For a basic deployment using a single SGD Gateway, run the following command:

```
# tarantella config edit --security-gateway ""
```

Note – For a load-balanced deployment using multiple SGD Gateways and an external load balancer, you do not need to edit the `--security gateway` attribute.

4. **(Optional) Remove the SGD Gateway from the list of SGD Gateways registered for the SGD array.**

   a. **Display the SGD Gateways registered for the SGD array.**

```
# tarantella gateway list
Installed gateway: gateway1.example.com
Issuer: CN=SGD, OU=Engineering, O=Sun Microsystems, L=Leeds, ST=Yorkshire, C=GB
Serial Number: 1208509056
Subject: CN=SGD, OU=Engineering, O=Sun Microsystems, L=Leeds, ST=Yorkshire, C=GB
Valid from Fri Sep 26 09:57:36 BST 2008 to Thu Dec 25 09:57:36 BST 2008
```

   b. **Remove the SGD Gateway from the list of SGD Gateways registered for the SGD array.**

```
# tarantella gateway remove --name gateway1.example.com
```

APPENDIX A

SGD Gateway Architecture Overview

This chapter describes the architecture and the main components of the SGD Gateway.

This chapter includes the following topics:

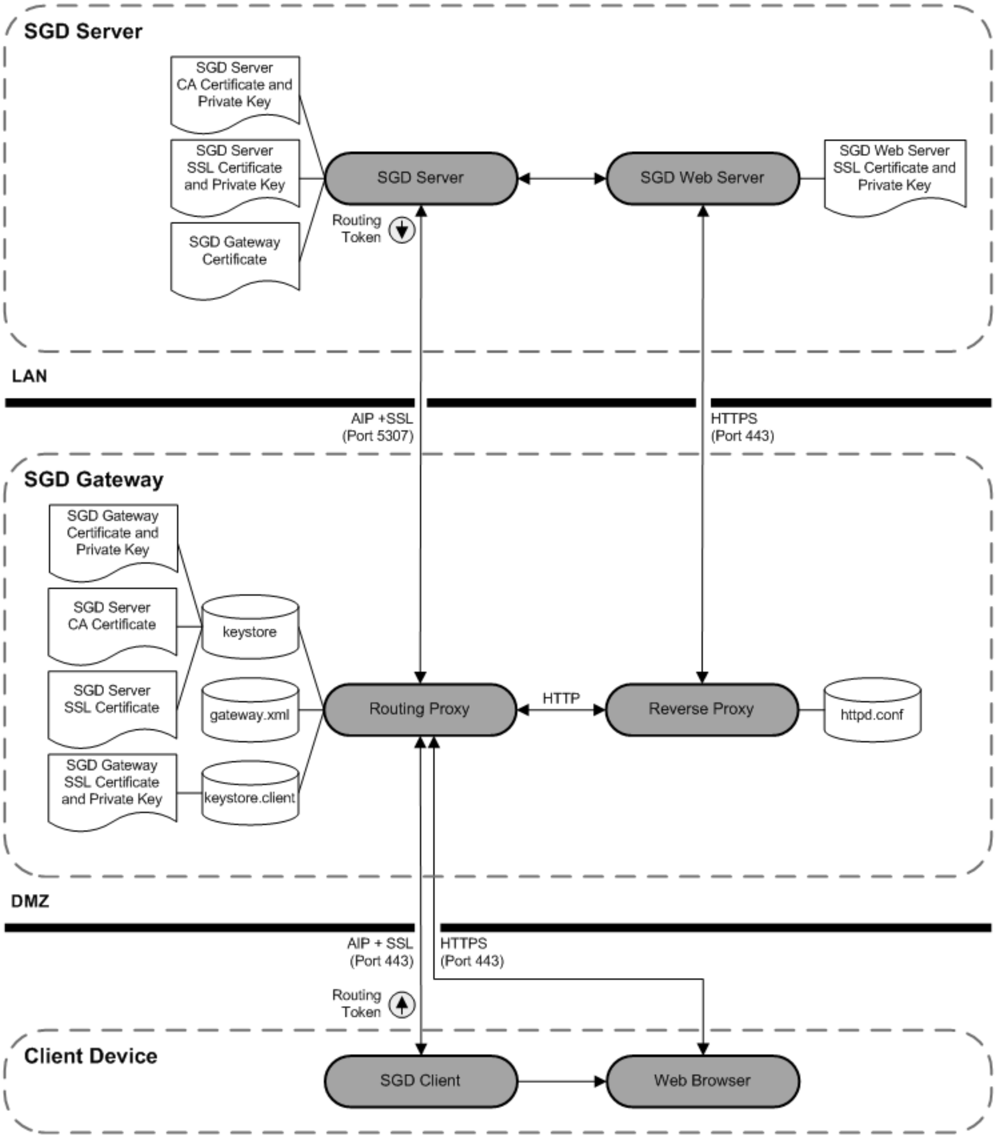
- "SGD Gateway Architecture" on page 21
- "Components of the SGD Gateway" on page 25

SGD Gateway Architecture

This section looks at the architecture of the SGD Gateway and includes a description of the connections made when you run SGD through the SGD Gateway.

FIGURE A-1 shows the architecture of the SGD Gateway.

FIGURE A-1 SGD Gateway Architecture



The following steps describe the connections made when you access SGD through the SGD Gateway. The steps cover the initial connection to SGD using a browser, logging on to SGD, through to starting an application.

1. A browser on the client device makes an Hypertext Transfer Protocol over Secure Sockets Layer (HTTPS) connection to the SGD Gateway, on TCP port 443.

- For a basic deployment, users can access SGD by going to the Uniform Resource Locator (URL) of the SGD Gateway.
- TCP port 443 is the default port for the SGD Gateway. The ports used by the SGD Gateway are defined in the routing proxy configuration file, `gateway.xml`. This file is created automatically during installation of the SGD Gateway, and is updated when the `gateway config` command is used to change the SGD Gateway configuration.
- The SGD Gateway presents an SSL certificate. This certificate is the only entry in the `keystore.client` keystore on the SGD Gateway.
- The location and passwords for the keystores used by the SGD Gateway are defined in the routing proxy configuration file, `gateway.xml`.

2. The routing proxy recognizes an HTTPS connection, decrypts the data stream, and forwards HTTP data to the Apache reverse proxy.
   - HTTP data is sent internally on the first free port above TCP port 8080.
   - The configuration for the Apache reverse proxy is defined by the `httpd.conf` file. This file and related reverse proxy configuration files are created automatically during installation of the SGD Gateway. The files are updated when the `gateway config` command is used to change the SGD Gateway configuration.

3. The reverse proxy uses HTTP load balancing to select an SGD Web Server in the array.
   - Connections between the reverse proxy and the SGD Web Server are secure, using HTTPS on TCP port 443.
   - The Apache reverse proxy sets a load balancing cookie in the browser. All subsequent HTTP requests by the browser use the same SGD Web Server.

4. The SGD Web Server delivers HTML to the browser on the client device.
   - The HTML is sent as HTTPS data on the connection established to TCP port 443 on the SGD Gateway.
   - The SGD Gateway forwards the HTTPS data to the browser.

5. The user logs in to SGD.
   - The SGD server authenticates the user, selects an SGD server to manage the user session, and starts a new user session.
   - The SGD Client is downloaded, installed, and started on the client device.
   - A routing token is included in HTML sent to the browser. The routing token contains the address of the SGD server selected to manage the user session. This information is used to route AIP data to the correct SGD server.
   - The routing token is signed using the private key of the SGD server, and then encrypted using the SGD Gateway certificate on the SGD server.
   - The routing token is passed to the SGD Client.

- Connections to the client device use HTTPS.

6. The SGD Client connects to the SGD Gateway on TCP port 443.
   - The data connection between the SGD Client and the SGD Gateway uses AIP over SSL.
   - The SSL certificate for the SGD Gateway is presented for the connection.
   - The routing proxy recognizes incoming AIP over SSL data.
   - The SSL data stream is decrypted, and the routing token is extracted from the AIP data stream.
   - The routing token is decrypted, using the SGD Gateway private key and then verified, using the CA certificate for the SGD server.
   - The SGD Gateway private key and the CA certificate for the SGD server are stored in the SGD Gateway keystore, `keystore`.
   - The time stamp on the routing token is checked, to ensure the routing token is valid.
   - The AIP data stream is re-encrypted using SSL.
7. AIP over SSL data is routed through the routing proxy to the SGD server indicated by the routing token.
   - The AIP over SSL data connection uses TCP port 5307.
   - The routing token is not included with the AIP data stream.
8. The user starts an application on the SGD webtop.
   - The application launch request is sent to the SGD Gateway using HTTPS.
   - The routing proxy recognises and decrypts HTTPS data, and forwards HTTP traffic to the Apache reverse proxy.
   - The reverse proxy detects the load balancing cookie and uses the SGD Web Server indicated by the cookie.
   - SGD application session load balancing selects the same SGD server to manage the application session.
   - A new routing token is created on the SGD server. The routing token is used to route AIP data to the SGD server selected to manage the application session.
   - The SGD server sends the routing token to the SGD Client. The routing token is included with the existing AIP data stream.
9. The SGD Client connects to the SGD Gateway on TCP port 443.
   - The SSL certificate for the SGD Gateway is presented for the connection.
   - The routing proxy recognizes incoming AIP over SSL data.
   - The routing token is decrypted, verified, and validated.
   - AIP over SSL data is routed through the routing proxy to the SGD server indicated by the routing token.

- The routing token is not included with the AIP data stream.

10. The SGD server manages the application session.
    - The application runs on an application server located on the local area network (LAN).

Components of the SGD Gateway

The SGD Gateway consists of the following components:

- **Routing proxy**. A Java™ technology-based application that routes AIP data connections to an SGD server.

  The main components of the routing proxy are:

  - Routing tokens – See "About Routing Tokens" on page 25
  - Keystores – See "Keystores Used By the SGD Gateway" on page 26
  - Routing proxy configuration file – See "Routing Proxy Configuration File" on page 27

- **Reverse proxy.** An Apache web server, configured to operate in reverse proxy mode. The reverse proxy also performs load balancing of HTTP connections.

  The main components of the reverse proxy are:

  - Configuration files for the Apache web server – See "Apache Web Server Configuration Files" on page 27
  - Apache modules for reverse proxying and HTTP load balancing – See "Apache Modules Used by the SGD Gateway" on page 28

About Routing Tokens

The SGD Gateway uses a *routing token* to manage an AIP connection. A routing token is a signed, encrypted message which identifies the origin and destination SGD server for a route. The routing token includes a time stamp, which is used to limit the token lifetime.

Outgoing routing tokens are:

- Signed on the SGD server, using the private key for the SGD server.
- Encrypted on the SGD server, using the SGD Gateway certificate.
- Sent to the SGD Client on the client device.

Incoming routing tokens are:

- Decrypted on the SGD Gateway, using the SGD Gateway private key.
- Verified on the SGD Gateway, using the CA certificate for the origin SGD server.
- Discarded on the SGD Gateway. The connection presenting the routing token is routed to the destination SGD server.

Keystores Used By the SGD Gateway

The SGD Gateway uses private keys and certificates to digitally sign and verify routing tokens, to secure connections to the SGD servers in the array, and to secure client connections to the SGD Gateway.

The certificates and private keys used by the SGD Gateway are stored in keystores in the `/opt/SUNWsgdg/proxy/etc` directory.

This directory contains the following keystores:

- **SGD Gateway keystore.** The SGD Gateway keystore, `keystore`, contains the SGD Gateway certificate and private key, CA certificates for the SGD servers in the array, and SGD server SSL certificates for secure connections to the SGD servers in the array.

  To add, remove, and list entries for the SGD Gateway keystore, use the `gateway` command.

- **Client keystore.** The client keystore, `keystore.client`, contains a single SGD Gateway SSL certificate used for securing connections between the client device and the SGD Gateway. By default, this keystore contains a self-signed certificate. You can replace this certificate with a certificate signed by a Certificate Authority (CA).

The keystores are created automatically when you run the `gateway setup` command after installing the SGD Gateway.

Note – Both keystores use the same password, which is defined in the `/opt/SUNWsgdg/etc/password` file. The password is a random password created automatically when the keystores are first created. The password file is only readable by superuser (root).

Routing Proxy Configuration File

The routing proxy configuration file is /opt/SUNWsgdg/etc/gateway.xml. This is an XML file that configures routes, depending on the data protocol type. The file also configures the keystore locations and passwords required for routing and SSL protocols.

The routing proxy configuration file is created automatically when you install the SGD Gateway and is updated when you use the gateway config create command to change the configuration of the SGD Gateway.

The default routing proxy configuration file uses the password in the /opt/SUNWsgdg/etc/password file to access the keystores used by the SGD Gateway. If you do not want to store this password on disk, make a note of the entry in the password file. Delete the password file, and delete the password entries for all <keystore> elements in the gateway.xml file. You are then prompted for the keystore password when you next start the SGD Gateway.

To change the password for a keystore used by the SGD Gateway, use the -storepasswd option of the keytool command. For example, to change the password for the keystore.client keystore run the following command:

```
# /opt/SUNWsgdg/java/default/bin/keytool -storepasswd \
-keystore /opt/SUNWsgdg/proxy/etc/keystore.client
```

Note – The /opt/SUNWsgdg/etc directory also contains one or more .template files. These files are used internally by the gateway config command to generate a gateway.xml file.

Apache Web Server Configuration Files

Configuration files for the Apache web server configured for use with the SGD Gateway are in the /opt/SUNWsgdg/httpd/httpd-2.2.9_openssl-0.9.8g_gateway/conf directory.

The configuration files in this directory are used to configure reverse proxy operation and load balancing for the Apache web server.

Configuring Reverse Proxying and Load Balancing

Files for configuring reverse proxy operation and load balancing are in the `extra/gateway` subdirectory. These files are enabled by the following `Include` directive in the main `httpd.conf` file:

```
# SGD Reverse Proxy/Load Balance settings
Include conf/extra/gateway/httpd-gateway.conf
```

The `httpd-gateway.conf` file configures reverse proxying and load balancing for the Apache web server. The members of the load balancing group are defined using an `Include` directive in the `httpd-gateway.conf` file, as follows:

```
<Proxy Balancer://mysgdservers/>
Include conf/extra/gateway/servers/*.conf
</Proxy>
```

The `extra/gateway/servers` directory contains configuration files for each of the SGD Web Servers in the load balancing group. The configuration files are named *server-name*`.conf`, where *server-name* is the server name used in the `gateway server add` command. See "`gateway server add`" on page 38 for more details about this command.

The SGD Gateway uses *sticky session* HTTP load balancing. This means that the Apache reverse proxy sets a cookie in the client browser, to ensure that the browser always returns to the SGD Web Server that was selected by load balancing. The cookie expires at the end of the user session.

Sticky session cookies are enabled by the `Header add Set-Cookie` directive in the `httpd-gateway.conf` file, as follows:

```
Header add Set-Cookie "BALANCEID=balanceworker.%{BALANCER_WORKER_ROUTE}e; path=
/" env=BALANCER_ROUTE_CHANGED
```

where `BALANCEID` is the name of the cookie, and `BALANCER_WORKER_ROUTE` and `BALANCER_ROUTE_CHANGED` are environment variables exported by the Apache `mod_proxy_balancer` module. See the Apache mod_proxy_balancer documentation for more information about these environment variables.

Apache Modules Used by the SGD Gateway

The Apache web server supplied with the SGD Gateway includes the following Apache modules for reverse proxying and load balancing:

- `mod_proxy`

- mod_proxy_ajp
- mod_proxy_balancer
- mod_proxy_connect
- mod_proxy_ftp
- mod_proxy_http

The modules are installed as Dynamic Shared Object (DSO) modules.

The modules are enabled by LoadModule directives in the httpd.conf Apache configuration file, at /opt/SUNWsgdg/httpd/httpd-2.2.9_openssl-0.9.8g_gateway/conf/httpd.conf.

APPENDIX **B**

Command-Line Reference

This chapter describes how you can manage, control, and change the configuration for the SGD Gateway from the command line.

Commands are provided for tasks such as setting up keystores and certificates, configuring the ports used by the SGD Gateway, and configuring load balancing for the SGD servers in the array.

This chapter includes the following topics:

The `gateway` Command

Use the `gateway` command to configure and control the SGD Gateway.

Note – The full path of the `gateway` command is `/opt/SUNWsgdg/bin/gateway`.

Syntax

```
gateway start | stop | restart | config | server | status | setup | version | sslcert
| sslkey | cert | key | setup | uninstall
```

Description

The available gateway commands are shown in the following table.

Command	Description	More Information
gateway start	Starts the SGD Gateway	"gateway start" on page 33
gateway stop	Stops the SGD Gateway	"gateway stop" on page 33
gateway restart	Stops and then restarts the SGD Gateway	"gateway restart" on page 34
gateway config	Configures the SGD Gateway, and updates the Apache reverse proxy configuration files	"gateway config" on page 34
gateway server	Installs SGD server security certificates and configures load balancing for the SGD array	"gateway server" on page 37
gateway status	Displays the current status for the SGD Gateway	"gateway status" on page 40
gateway version	Displays the version number of the SGD Gateway	"gateway version" on page 41
gateway sslcert	Exports and prints the Secure Sockets Layer (SSL) certificate in the client keystore	"gateway sslcert" on page 41
gateway sslkey	Manages the private key and certificate in the client keystore	"gateway sslkey" on page 43
gateway cert export	Exports the SGD Gateway certificate from the SGD Gateway keystore	"gateway cert export" on page 46
gateway key import	Imports a private key and certificate into the SGD Gateway keystore	"gateway key import" on page 47
gateway setup	Runs the SGD Gateway setup program	"gateway setup" on page 48
gateway uninstall	Uninstalls the SGD Gateway software	"gateway uninstall" on page 49

Note – All gateway commands include a --help option. You can use this option to display help for the command.

Examples

The following example starts the SGD Gateway.

```
# /opt/SUNWsgdg/bin/gateway start
```

The following example means that the SGD server `server.example.com` is not authorized to use the SGD Gateway.

```
# /opt/SUNWsgdg/bin/gateway server remove --server server.example.com
```

gateway start

Starts the SGD Gateway.

Syntax

```
gateway start
```

Description

Starts the SGD Gateway.

Examples

The following example starts the SGD Gateway.

```
# /opt/SUNWsgdg/bin/gateway start
SGD Gateway started successfully
```

gateway stop

Stops the SGD Gateway.

Syntax

```
gateway stop [--force]
```

Description

Stops the SGD Gateway, after prompting the user for confirmation.

The `--force` option stops the SGD Gateway, without asking for confirmation.

Examples

The following example stops the SGD Gateway, prompting the user for confirmation.

```
# /opt/SUNWsgdg/bin/gateway stop
```

gateway restart

Stops and then restarts the SGD Gateway.

Syntax

```
gateway restart [--force]
```

Description

Stops and then restarts the SGD Gateway. Before stopping the SGD Gateway, the user is prompted for confirmation.

The `--force` option stops the SGD Gateway, without asking for confirmation.

Examples

The following example stops and restarts the SGD Gateway, prompting the user for confirmation.

```
# /opt/SUNWsgdg/bin/gateway restart
```

gateway config

Configures the SGD Gateway. The `gateway config` command configures secure connections, ports, and reverse proxy server settings for the SGD Gateway.

Syntax

```
gateway config create | show
```

Description

The following table shows the available subcommands for this command.

Subcommand	Description	More Information
`create`	Creates a new configuration for the SGD Gateway	"`gateway config create`" on page 35
`show`	Lists the current configuration for the SGD Gateway	"`gateway config show`" on page 36

Examples

The following example lists the current configuration for the SGD Gateway.

```
# /opt/SUNWsgdg/bin/gateway config show
```

`gateway config create`

Creates a new configuration for the SGD Gateway, overwriting the current configuration.

Syntax

```
gateway config create { [ --interface interface:port ]
                        [ --entry-point ip-address:port ]
                        [ --out plaintext | ssl ]
                       } | --file file
```

Description

The following table shows the available options for this command.

Option	Description
`--interface`	Interface and port that the SGD Gateway listens on for incoming proxy connections. The default is Transmission Control Protocol (TCP) port 443, on all interfaces.
`--entry-point`	Entry point for the network. This is the Internet Protocol (IP) address, and port that clients use to connect to the SGD Gateway. You can specify a Domain Name System (DNS) address instead of an IP address.
`--out`	Format of outgoing traffic from the SGD Gateway to the SGD servers in the array. If you are using secure connections, choose `ssl`.
`--file`	Specifies a file containing configuration settings.

Note – If no options are specified for the `gateway config create` command, a series of online prompts are displayed, enabling you to type in the required settings.

If you use the `--file` option for `gateway config create`, the specified file must be of the same format as the `/opt/SUNWsgdg/etc/gatewayconfig.xml` file. This file is created during initial configuration of the SGD Gateway, as described in "How to Configure the Ports and Connections for the SGD Gateway" on page 12.

Examples

The following example configures an SGD Gateway to listen on TCP port 443 for connections from the network entry point, at 192.168.0.1. Secure connections are used between the SGD Gateway and the SGD servers in the array.

```
# /opt/SUNWsgdg/bin/gateway config create --interface *:443 \
--entry-point 192.168.0.1:443 --out ssl
```

`gateway config show`

Lists the current SGD Gateway configuration.

Syntax

`gateway config show`

Description

Shows the current configuration for the SGD Gateway.

The current SGD Gateway configuration is stored in the `/opt/SUNWsgdg/etc/gatewayconfig.xml` file.

Examples

The following example lists the current SGD Gateway configuration.

```
# /opt/SUNWsgdg/bin/gateway config show
```

`gateway server`

Authorizes SGD servers to use the SGD Gateway.

Syntax

`gateway server add | remove | list`

Description

The following table shows the available subcommands for this command.

Subcommand	Description	More Information
`add`	Authorizes an SGD server to use the SGD Gateway	"`gateway server add`" on page 38
`remove`	Removes authorization for an SGD server to use the SGD Gateway	"`gateway server remove`" on page 39
`list`	Lists the SGD servers authorized to use the SGD Gateway	"`gateway server list`" on page 40

Examples

The following example removes authorization to use the SGD Gateway for the SGD server `sgd.example.com`.

```
 # /opt/SUNWsgdg/bin/gateway server remove --server sgd.example.com
```

gateway server add

Authorizes an SGD server to use the SGD Gateway.

Syntax

```
gateway server add --server server-name
                   --certfile cert-file
                   --url server-url
                 [ --ssl-certfile ssl-cert ]
```

Description

The following table shows the available options for this command.

Option	Description
`--server`	DNS name of the SGD server
`--cert-file`	CA certificate for the SGD server
`--url`	URL for the SGD Web Server
`--ssl-certfile`	SSL certificate for the SGD server

The `gateway server add` command does the following:

- Imports the CA certificate for the SGD server into the SGD Gateway keystore, at `/opt/SUNWsgdg/proxy/etc/keystore`. The CA certificate is stored to the keystore using an alias with the same name as the SGD server specified by the `--server` option.
- Imports the SSL certificate for the SGD server into the SGD Gateway keystore, at `/opt/SUNWsgdg/proxy/etc/keystore`. The SSL certificate is stored to the keystore using an alias constructed by appending “-ssl” to the SGD server name specified by the `--server` option.

- Adds the SGD server to the load balancing group used by the Apache reverse proxy server

Note – After using `gateway server add`, you must restart the SGD Gateway for any changes to take effect.

Examples

The following example adds the CA certificate `PeerCAcert.pem` to the SGD Gateway keystore, using the alias `sgd.example.com`. The SSL certificate `cert.pem` is also added to the keystore, using the alias `sgd.example.com-ssl`.

```
# /opt/SUNWsgdg/bin/gateway server add --server sgd.example.com \
--certfile PeerCAcert.pem \
--url https://sgd.example.com \
--ssl-certfile cert.pem
```

In this example, the Uniform Resource Locator (URL) for the SGD Web Server, `https://sgd.example.com`, is added to the reverse proxy load balancing group and a configuration file is created at `/opt/SUNWsgdg/httpd/httpd-2.2.9_openssl-0.9.8g_gateway/conf/extra/gateway/servers/conf/sgd.example.com.conf`.

`gateway server remove`

Removes authorization for an SGD server to use the SGD Gateway.

Syntax

`gateway server remove --server` *server-name*

Description

The CA certificate and SSL certificate for the SGD server are removed from the SGD Gateway keystore.

Note – After using `gateway server remove`, you must restart the SGD Gateway for any changes to take effect.

Examples

The following example removes authorization for the SGD server `sgd.example.com` to use the SGD Gateway.

```
# /opt/SUNWsgdg/bin/gateway server remove --server sgd.example.com
```

gateway server list

Shows details for the SGD servers authorized to use the SGD Gateway.

Syntax

```
gateway server list
```

Description

This command shows certificate details and URLs for the SGD servers that are authorized to use the SGD Gateway.

Examples

The following example lists details of the authorized SGD servers for the SGD Gateway.

```
# /opt/SUNWsgdg/bin/gateway server list
```

gateway status

Displays the current status of the SGD Gateway.

Syntax

```
gateway status
```

Description

This command indicates if the SGD Gateway is started, stopped, or if there is a problem.

Examples

The following example displays status information for the SGD Gateway. In this example, the SGD Gateway is stopped.

```
# /opt/SUNWsgdg/bin/gateway status
SGD Gateway status: STOPPED
```

gateway version

Displays the version number of the SGD Gateway software.

Syntax

```
gateway version
```

Description

Displays the version number of the SGD Gateway.

Examples

The following example displays the SGD Gateway version installed on the host where the command is run.

```
# /opt/SUNWsgdg/bin/gateway version
Sun Secure Global Desktop Gateway 4.50.301
```

gateway sslcert

Print or exports the SGD Gateway SSL certificate stored in the client keystore.

Syntax

```
gateway sslcert export | print
```

Description

The following table shows the available subcommands for this command.

Subcommand	Description	More Information
`export`	Exports the SGD Gateway SSL certificate from the client keystore	"`gateway sslcert export`" on page 42
`print`	Prints the SGD Gateway SSL certificate stored in the client keystore	"`gateway sslcert print`" on page 43

Examples

The following example prints the SGD Gateway SSL certificate stored in the client keystore.

```
# /opt/SUNWsgdg/bin/gateway sslcert print
```

`gateway sslcert export`

Exports the SGD Gateway SSL certificate from the client keystore.

Syntax

gateway sslcert export --certfile *cert-file*

Description

Exports the SGD Gateway SSL certificate from the client keystore, at `/opt/SUNWsgdg/proxy/etc/keystore.client`. The certificate is written to the file specified by the `--certfile` option.

To access the client keystore, this command uses the password in `/opt/SUNWsgdg/etc/password`. If this file is not present, the command prompts for a password.

Examples

The following example exports the SGD Gateway SSL certificate from the client keystore to the file, gateway-ssl.pem.

```
 # /opt/SUNWsgdg/bin/gateway sslcert export --certfile gateway-ssl.pem
```

gateway sslcert print

Prints the SGD Gateway SSL certificate.

Syntax

```
gateway sslcert print
```

Description

Prints the SGD Gateway SSL certificate stored in the client keystore, at /opt/SUNWsgdg/proxy/etc/keystore.client.

The command writes details of the certificate to the terminal window.

To access the client keystore, this command uses the password in /opt/SUNWsgdg/etc/password. If this file is not present, the command prompts for a password.

Examples

The following example prints the SGD Gateway SSL certificate stored in the client keystore.

```
 # /opt/SUNWsgdg/bin/gateway sslcert print
```

gateway sslkey

Manages SSL key and certificate entries in the client keystore.

Syntax

```
gateway sslkey import | export
```

Description

The following table shows the available subcommands for this command.

Subcommand	Description	More Information
`import`	Imports a private key and certificate into the client keystore	"`gateway sslkey import`" on page 44
`export`	Exports a private key from the client keystore	"`gateway sslkey export`" on page 45

Examples

The following example exports the SGD Gateway SSL certificate stored in the client keystore.

```
# /opt/SUNWsgdg/bin/gateway sslkey export --keyfile gateway-ssl.key
```

gateway sslkey import

Imports an SSL key and certificate into the client keystore.

Syntax

```
gateway sslkey import --keyfile key-file
                     [ --keypass passwd ]
                     [ --keyalg RSA|DSA ]
                     { --certfile cert-file |
                       --certfile cert-file.. [ --cacertfile ca-cert-file ] }
```

Description

Imports an SSL private key, and the corresponding SSL certificate, into the client keystore, at `/opt/SUNWsgdg/proxy/etc/keystore.client`. If the client keystore already has an entry, it is overwritten.

To access the client keystore, this command uses the password in /opt/SUNWsgdg/etc/password. If this file is not present, the command prompts for a password.

The following table shows the available options for this command.

Option	Description
--keyfile	File containing the SSL private key.
--keypass	Password for the SSL private key. By default, the password from /opt/SUNWsgdg/etc/password is used.
--keyalg	Encoding algorithm used by the private key. Options are RSA and Digital Signature Algorithm (DSA). By default, RSA is selected.
--certfile	SSL certificate file.
--cacertfile	Certificate Authority (CA) or root certificate file.

To import a certificate chain, use the --cacertfile option to specify the Intermediate CA certificate. All certificates in the chain must be in Privacy Enhanced Mail (PEM) format.

Examples

The following example imports an RSA-encoded SSL private key gateway1-ssl.key, and the corresponding SSL certificate gateway1-ssl.pem, into the client keystore.

```
# /opt/SUNWsgdg/bin/gateway sslkey import \
--keyfile gateway1-ssl.key \
--certfile gateway1-ssl.pem
```

The following example imports an RSA-encoded SSL private key and an SSL certificate chain into the client keystore. The Intermediate CA certificate is gateway1-ca.pem.

```
# /opt/SUNWsgdg/bin/gateway sslkey import \
--keyfile gateway1-ssl.key \
--certfile gateway1-ssl.pem \
--cafile gateway1-ca.pem
```

gateway sslkey export

Exports the SGD Gateway SSL private key from the client keystore.

Syntax

```
gateway sslkey export --keyfile key-file [ --keypass passwd ]
```

Description

Exports the SGD Gateway SSL private key from the client keystore, at `/opt/SUNWsgdg/proxy/etc/keystore.client`. The private key is written to the file specified by the `--keyfile` option.

A password for the private key can be specified using the `--keypass` option. By default, the password from `/opt/SUNWsgdg/etc/password` is used.

Examples

The following example exports the SGD Gateway SSL private key from the client keystore to the file, `gateway-ssl.key`.

```
# /opt/SUNWsgdg/bin/gateway sslkey export --keyfile gateway-ssl.key
```

`gateway cert export`

Exports the SGD Gateway certificate from the SGD Gateway keystore.

Syntax

```
gateway cert export --certfile file-name
```

Description

Exports the SGD Gateway certificate from the SGD Gateway keystore, at `/opt/SUNWsgdg/proxy/etc/keystore`. The certificate is written to the file specified by the `--certfile` option.

To access the SGD Gateway keystore, this command uses the password in `/opt/SUNWsgdg/etc/password`. If this file is not present, the command prompts for a password.

Examples

The following example exports the SGD Gateway certificate from the SGD Gateway keystore to the file, `gateway1.pem`.

```
 # /opt/SUNWsgdg/bin/gateway cert export --certfile gateway1.pem
```

gateway key import

Imports an SGD Gateway key and SGD Gateway certificate into the SGD Gateway keystore.

Syntax

```
gateway key import --keyfile key-file
                  [ --keypass passwd ]
                  [ --keyalg RSA|DSA ]
                  { --certfile cert-file |
                    --certfile cert-file.. [ --cacertfile ca-cert-file ] }
```

Description

Imports a private key, and the corresponding public key certificate, into the SGD Gateway keystore, at `/opt/SUNWsgdg/proxy/etc/keystore`. If the keystore already has an SGD Gateway key entry, it is overwritten.

To access the SGD Gateway keystore, this command uses the password in `/opt/SUNWsgdg/etc/password`. If this file is not present, the command prompts for a password.

The following table shows the available options for this command.

Option	Description
`--keyfile`	File containing the private key.
`--keypass`	Password for the private key. By default, the password from `/opt/SUNWsgdg/etc/password` is used.
`--keyalg`	Encoding algorithm used by the private key. Options are RSA and DSA. By default, RSA is selected.
`--certfile`	SSL certificate file.
`--cacertfile`	CA or root certificate file.

To import a certificate chain, use the --cacertfile option to specify an Intermediate CA certificate. All certificates in the chain must be in Privacy Enhanced Mail (PEM) format.

Examples

The following example imports an RSA-encoded private key gateway1.key, and the corresponding public key certificate gateway1.pem, into the SGD Gateway keystore.

```
# /opt/SUNWsgdg/bin/gateway key import \
--keyfile gateway1.key \
--certfile gateway1.pem
```

The following example imports a private key and a certificate chain into the SGD Gateway keystore. The Intermediate CA certificate is gateway1-ca.pem.

```
# /opt/SUNWsgdg/bin/gateway key import \
--keyfile gateway1.key \
--certfile gateway1.pem \
--cafile gateway1-ca.pem
```

gateway setup

Runs the setup program for the SGD Gateway.

Syntax

```
gateway setup
```

Description

Answer the on-screen questions to configure ports, interfaces, and security settings used by the SGD Gateway.

Examples

The following example runs the SGD Gateway setup program.

```
# /opt/SUNWsgdg/bin/gateway setup
```

gateway uninstall

Uninstalls the SGD Gateway software.

Syntax

```
gateway uninstall
```

Description

Stops the SGD Gateway and removes the SGD Gateway software, including all configuration information.

Before stopping the SGD Gateway, the command prompts the user for confirmation.

Examples

The following example uninstalls the SGD Gateway software from the host where the command is run.

```
# /opt/SUNWsgdg/bin/gateway uninstall
```

The `tarantella gateway` Command

Use the `tarantella gateway` command to configure authorized gateways for an SGD array.

Syntax

```
tarantella gateway add | list | remove
```

Description

Using the `tarantella gateway` command, you can add, remove, and list the gateways for an SGD array.

The `tarantella gateway` command can be used on any SGD server in the array. Any changes you make are automatically replicated on other array members.

When an SGD server joins an array, the set of gateways defined on the primary SGD server is copied to the new array member, overwriting any authorized gateways already present. Registered gateways are not deleted from an SGD server when it is detached from an array.

The available subcommands for the `tarantella gateway` command are shown in the following table.

Subcommand	Description	More Information
`add`	Adds an SGD Gateway for an SGD array	"`tarantella gateway add`" on page 51
`list`	Lists the SGD Gateways for an SGD array	"`tarantella gateway list`" on page 52
`remove`	Removes an SGD Gateway for an SGD array	"`tarantella gateway remove`" on page 52

Note – All `tarantella gateway` subcommands include a `--help` option. You can use this option to display help for the subcommand.

Examples

The following example adds `gateway1.example.com` to the list of registered gateways for the SGD array.

```
# tarantella gateway add --name gateway1.example.com \
--certfile /opt/gateway1_cert_file.pem
```

tarantella gateway add

Registers an SGD Gateway with an SGD array.

Syntax

```
tarantella gateway add {
                        --name server-name
                        --certfile cert-file
                        } | --file file
```

Description

The following table shows the available options for this command.

Option	Description
`--name`	Name of the SGD Gateway to register.
`--certfile`	SGD Gateway certificate used by the SGD server. The certificate can be in Definite Encoding Rules (DER) or PEM format.
`--file`	A batch file containing configuration settings for multiple SGD Gateways.

Examples

The following example adds `gateway1.example.com` to the list of registered gateways for the SGD array.

```
# tarantella gateway add --name gateway1.example.com \
--certfile /opt/gateway1_cert_file.pem
```

The following example uses the `--file` option of `tarantella gateway add` to register multiple gateways at the same time.

```
# tarantella gateway add --file gateways.list
```

The `--file` option specifies a batch file, `gateways.list`, that contains a line of settings for each gateway, as follows:

```
--name gateway1.example.com --certfile /opt/gateway1_cert_file.pem
--name gateway2.example.com --certfile /opt/gateway2_cert_file.pem
```

tarantella gateway list

Lists the SGD Gateways registered for an SGD array.

Syntax

```
tarantella gateway list
```

Description

Shows details for the SGD Gateways that have been registered for an SGD array using `tarantella gateway add`.

Examples

The following example lists the registered gateways for the SGD array.

```
# tarantella gateway list
```

tarantella gateway remove

Removes an SGD Gateway from the list of registered gateways for an SGD array.

Syntax

`tarantella gateway remove --name` *server-name* `| --file` *file*

Description

The following table shows the available options for this command.

Option	Description
`--name`	Name of the SGD Gateway to remove registration details for
`--file`	A batch file containing configuration settings for multiple SGD Gateways

Examples

The following example removes the SGD Gateway `gateway1.example.com` from the list of registered gateways for the SGD array.

```
# tarantella gateway remove --name gateway1.example.com
```

The `--security-gateway` Attribute

You use the `--security-gateway` attribute to enable SGD Gateway usage for the SGD array. The attribute defines the SGD Clients that can access the SGD Gateway, based on their IP address or DNS name.

Changes to the `--security-gateway` attribute apply to all SGD servers in the array.

The syntax for the attribute is as follows:

`--security-gateway` *filter-spec*`...`

Replace *filter-spec* with a filter specification of the type:

client-ip-address | * : *gateway protocol* : *gateway-address* : *gateway-port*

where *client-ip-address* is the IP address of the SGD Client. An asterisk, *, represents all IP addresses. The *gateway protocol* is `sgdg` for connections through the SGD Gateway, or `direct` for SGD Clients that connect directly to an SGD array, without going through the SGD Gateway.

Note – If you are using an external load balancer with the SGD Gateway, type the address of the load balancer for the *client-ip-address*.

Separate multiple *filter-spec* entries with a “`;`” character.

The following example enables all SGD Clients to connect using TCP port 443 of the SGD Gateway `gateway1.example.com`.

```
# tarantella config edit --security-gateway "*:sgdg:gateway1.example.com:443"
```

The following example enables all SGD Clients to connect using an external load balancer, `lb.example.com`.

```
# tarantella config edit --security-gateway \
"*:sgdg:lb.example.com:443"
```

You can use multiple filter specifications, as follows:

```
"192.168.10.*:sgdg:gateway1.example.com:443; \
192.168.5.*:sgdg:gateway2.example.com:443; \
*:direct:sgd1.example.com:80"
```

With this configuration, the following applies:

- SGD Clients with IP addresses beginning `192.168.10` can connect using TCP port 443 of the SGD Gateway `gateway1.example.com`.
- SGD Clients with IP addresses beginning `192.168.5` can connect using TCP port 443 of the SGD Gateway `gateway2.example.com`.
- All other SGD Clients connect directly to TCP port 80 on the SGD server `sgd1.example.com`, without using the SGD Gateway.
- The order of the filters is important. If the order of the filters is reversed, all SGD Clients connect directly to the SGD server `sgd1.example.com`.

APPENDIX C

Advanced Configuration

This chapter includes information about configuring and using the advanced features of the SGD Gateway.

This chapter includes the following topics:

- "Advanced Configuration Topics" on page 55
- "Configuring Access Manager" on page 60
- "Using the Reflection Service" on page 62

Advanced Configuration Topics

This section includes the following advanced configuration topics:

- "Tuning the SGD Gateway" on page 55
- "Configuring HTTP Redirection" on page 57
- "Changing the Binding Port for the SGD Gateway" on page 58
- "Enabling the Balancer Manager Application" on page 58
- "Using Unencrypted Connections to the SGD Array" on page 59

Tuning the SGD Gateway

When you install the SGD Gateway, default values for the maximum number of simultaneous Adaptive Internet Protocol (AIP) and Hypertext Transfer Protocol (HTTP) connections are configured automatically, based on the available memory on the SGD Gateway host. The memory size allocated to the SGD Gateway's Java Virtual Machine (JVM™) is also optimized for this number of connections.

After installing the SGD Gateway, depending on the expected number of SGD users and the number of applications they will run, you can adjust the default settings. When you do this, you might also need to adjust the JVM memory size. This process is called *tuning* the SGD Gateway.

To tune the SGD Gateway, you do the following:

- **Change the maximum number of AIP connections.**

  The maximum number of AIP connections is configured at install time. The default setting depends on the memory resources available on the SGD Gateway host.

  To change the maximum number of AIP connections, edit the relevant `<maxConnections>` setting in the routing proxy configuration file, `/opt/SUNWsgdg/etc/gateway.xml`.

  See "Calculating the Number of AIP Connections" on page 57 for details of how to calculate the maximum number of AIP connections used by the SGD Gateway.

- **Change the maximum number of HTTP connections.**

  The maximum number of HTTP connections is configured at install time. The default value is 100.

  To change the maximum number of HTTP connections, edit the relevant `<maxConnections>` setting in the routing proxy configuration file, `/opt/SUNWsgdg/etc/gateway.xml`.

- **Change the JVM memory size.**

  When you change the maximum number of AIP and HTTP connections, you might need to change the memory size allocated to the SGD Gateway's JVM. To do this, edit the following settings in the `/opt/SUNWsgdg/proxy/etc/tuning_parameters` file:

  - `-Xms` – Initial memory size for the JVM
  - `-Xmx` – Maximum memory size for the JVM

  See "Calculating the JVM Memory Size" on page 57 for details of how to calculate these values.

Note – Ensure that your system is configured with sufficient memory resources for the JVM settings you make.

You must restart the SGD Gateway to enable any changes you make.

Calculating the Number of AIP Connections

The number of AIP connections used by an SGD Gateway depends on the number of concurrent SGD users, and the number of applications they run, as follows:

Number of AIP connections = (*number of applications* + 3) x *number of SGD users*

For example, an SGD Gateway with 1000 SGD users, each running four applications requires the following maximum number of simultaneous AIP connections:

(4 + 3) x 1000 = 7000 AIP connections

Calculating the JVM Memory Size

The amount of JVM memory used by the SGD Gateway depends on the number of simultaneous AIP connections and HTTP connections.

As each SGD Gateway connection requires approximately 300 kilobytes of JVM memory, the required JVM memory is given by:

(*number of AIP connections* + *number of HTTP connections*) x 300 kilobytes

For example, consider an SGD Gateway with 500 SGD users, each running two applications. The maximum number of simultaneous AIP connections is:

(2 + 3) x 500 = 2500 AIP connections

The SGD Gateway also needs to handle sufficient simultaneous HTTP connections to deliver webtop content to all SGD users. For this example, the maximum number of HTTP connections is:

250 HTTP connections

So, the required JVM memory is:

(2500 + 250) x 300 kilobytes = 806 Megabytes, approximately.

Note – In the `/opt/SUNWsgdg/etc/tuning_parameters` file, set `-Xms` and `-Xmx` to the calculated JVM memory value.

Configuring HTTP Redirection

By default, the SGD Gateway refuses HTTP connections on Transmission Control Protocol (TCP) port 80.

To enable connections on TCP port 80, remove the comments in the routing proxy configuration file, /opt/SUNWsgdg/etc/gateway.xml that disable this feature.

```
<!-- Uncomment to:
     Accept HTTP traffic on port 80 and send to reverse proxy
     to cause redirect to HTTPS.
<route>
  ...
</route>
-->
```

You must restart the SGD Gateway to enable any changes you make.

Changing the Binding Port for the SGD Gateway

The interface and port that the SGD Gateway uses for incoming connections is called the *binding port*. By default, the SGD Gateway uses TCP port 443 on all interfaces as the binding port.

To change the binding port, edit the following configuration in the routing configuration file, /opt/SUNWsgdg/etc/gateway.xml.

```
<!--
    Accept SSL connections and split into SSL+AIP or HTTPS traffic.
    CONFIGURATION: Set the listening port for SSL connections here.
-->
<subService id="tcpservice">
  <binding>*:443</binding>
</subService>
```

Alternatively, you can change the binding port by running the /opt/SUNWsgdg/bin/gateway config create command on the SGD Gateway host. This command prompts you to specify an interface and port to use for incoming proxy connections.

You must restart the SGD Gateway to enable any changes you make.

Enabling the Balancer Manager Application

The Apache reverse proxy includes a web application called Balancer Manager. Balancer Manager enables you to manage the SGD Web Servers in the load balancing group used by the reverse proxy.

Using Balancer Manager, you can do the following:

- View status information for SGD Web Servers in the load balancing group
- View and change load balancing routes for SGD Web Servers
- Remove SGD Web Servers from the load balancing group

To enable Balancer Manager, remove the comments in the reverse proxy configuration file, `/opt/SUNWsgdg/httpd/httpd-2.2.9_openssl-0.9.8g_gateway/conf/extra/gateway/httpd-gateway.conf` that disable the application.

```
# Allows the configuration of load balancing parameters
#
#    <Location /balancer-manager>
#        SetHandler balancer-manager
#        Order Deny,Allow
#        Deny from all
#        Allow from all
#    </Location>
```

You must restart the reverse proxy to enable any changes you make.

To access Balancer Manager, start a browser and go to `https://`*gateway.example.com*`/balancer-manager`, where *gateway.example.com* is the SGD Gateway host.

For more details about configuring the Balancer Manager, see the Apache mod_proxy_balancer documentation.

Using Unencrypted Connections to the SGD Array

By default, connections between the SGD Gateway and the SGD servers in the array are secured using Secure Sockets Layer (SSL). This means that AIP over SSL data uses TCP port 5307, and HTTPS data uses TCP port 443.

To use unencrypted connections between the SGD Gateway and the SGD servers in the array, run the following command:

```
# gateway config create
```

When prompted whether to use secure connections to the SGD server, type `n`.

Note – Ensure that the SGD servers in the array are configured to use standard, unencrypted connections. To do this, run `tarantella security stop` on each SGD server in the array to turn off SGD security services.

For unencrypted connections, AIP data uses TCP port 3144, and HTTP data uses TCP port 80.

Configuring Access Manager

You can use Sun Java™ System Access Manager to authenticate users who log in to SGD using web server authentication. This section describes how to install and configure Access Manager for use with the SGD Gateway.

Configuring Access Manager to work with the SGD Gateway involves the following configuration steps:

1. Install and configure a web agent for the Apache server used by the SGD Gateway.

   Access Manager uses a *web agent* to control access to content on Apache web servers.

   See "How to Install and Configure a Web Agent for the SGD Gateway Apache Server" on page 60.

2. Install and configure web agents for all SGD servers in the array.

   See "How to Install and Configure Web Agents for the SGD Array" on page 61.

▼ How to Install and Configure a Web Agent for the SGD Gateway Apache Server

1. **Install the Apache HTTP Server 2.2 Policy Agent software on the SGD Gateway Apache server host.**

   See the Policy Agent Guide for Apache HTTP Server 2.2 for details of how to install the software.

2. **Configure the web agent on the SGD Gateway Apache server host.**

   Ensure that the following setting is made in the web agent configuration file, `AMagent.properties`.

   ```
   com.sun.am.policy.agents.config.do_sso_only = true
   ```

3. **Restart the SGD Gateway.**

   On the SGD Gateway host, run the following command:

```
# /opt/SUNWsgdg/bin/gateway restart
```

▼ How to Install and Configure Web Agents for the SGD Array

Before using the following procedure, ensure that the SGD array is configured to use web server authentication. Instructions on how to do this are included in the *Sun Secure Global Desktop 4.41 Administration Guide*.

Repeat the following procedure for all SGD hosts in the array.

1. **Install the Apache HTTP Server 2.2 Policy Agent software on the SGD host.**

   See the Policy Agent Guide for Apache HTTP Server 2.2 for details of how to install the software.

2. **Configure the web agent on the SGD host.**

   Ensure that the following settings are made in the web agent configuration file, `AMagent.properties`.

   - Set the fetch mode attribute.

```
com.sun.am.policy.agents.config.profile.attribute.fetch.mode=HTTP_HEADER
```

   - Map the SGD server name to the SGD Gateway name.

```
com.sun.am.policy.agents.config.fqdn.map = sgd1.example.com|gateway1.example.com
```

     where *sgd1.example.com* is the name of the SGD server, and *gateway1.example.com* is the name of the SGD Gateway.

   - Configure the resources on the server that you do not wish to be enforced.

```
com.sun.am.policy.agents.config.notenforced_list=http://sgd1.example.com:80/index*
http://sgd1.example.com:80/axis* http://localhost:80/axis*
```

     where *sgd1.example.com* is the name of the SGD server.

   - Ensure that the User Id parameter is set to `UserToken`.

```
com.sun.am.policy.am.userid=UserToken
```

3. **Restart the SGD server and SGD Web Server.**

```
# tarantella restart
```

Using the Reflection Service

The reflection service enables an SGD Gateway Administrator to view routes and connection information for the SGD Gateway, using a browser.

By default, the reflection service is not enabled for the SGD Gateway.

▼ How to Enable the Reflection Service

1. **On the SGD Gateway host, log in as superuser (root).**

2. **Enable the reflection service in the routing proxy configuration file.**

   The routing proxy configuration file is at `/opt/SUNWsgdg/etc/gateway.xml`.

   Remove the comments from the following configuration in this file.

   ```
   <!--
       <service id="reflection" class="Reflection">
           <subService id="tcpservice">
               <binding>localhost:81</binding>
           </subService>
       </service>
   -->
   ```

   This configuration enables unauthenticated access to the reflection service from the SGD Gateway host only.

   The default port used by the reflection service is TCP port 81. You can change this to another port that is not in use.

3. **Restart the SGD Gateway.**

```
# /opt/SUNWsgdg/bin/gateway restart
```

4. **Use a browser to access the reflection service.**

   On the SGD Gateway host, start a browser and go to `http://localhost:81`.

   The home page for the reflection service is shown.

APPENDIX **D**

Troubleshooting the SGD Gateway

This chapter includes troubleshooting topics, to help you to diagnose and fix problems with the SGD Gateway.

This chapter includes the following topics:

- "Logging and Diagnostics" on page 63
- "SGD Gateway Error Messages" on page 66

Logging and Diagnostics

This section describes the logging and diagnostics features of the SGD Gateway.

This section includes the following topics:

- "About SGD Gateway Logging" on page 63
- "Displaying SGD Gateway Process Information" on page 65
- "Checking the Configuration From the Command Line" on page 65
- "SGD Gateway Error Messages" on page 66

About SGD Gateway Logging

SGD Gateway logging uses the Java logging application programming interface (API). For more details about how logging is implemented in Java, see `http://java.sun.com/javase/6/docs/technotes/guides/logging/overview.html`.

Changing the Logging Level

A logging properties configuration file, logging.properties, is supplied with the SGD Gateway. This file is in the /opt/SUNWsgdg/proxy/etc directory.

You can edit the logging.properties file to change the default logging level, and to configure logging levels for specific SGD Gateway services. Each SGD Gateway service is represented by an async.channel entry in the logging.properties file.

For example, if you want to increase logging levels for incoming and outgoing TCP connections, set the TCP service logging level to FINEST. Uncomment the following line in the logging.properties file:

```
# async.channel.tcp.level=FINEST
```

You must restart the SGD Gateway to enable any changes to logging levels you make by editing the logging.properties file.

Note – You can also use the SGD Gateway reflection service to change logging levels. See "Using the Reflection Service" on page 62 for information about configuring and using the reflection service.

Log File Locations

If you have problems with the SGD Gateway, consult the following log files:

- **Routing proxy log files.** The location and names of these log files are set in the logging.properties file. By default, the SGD Gateway creates routing proxy log files in the /opt/SUNWsgdg/proxy/var/log directory on the SGD Gateway host.
- **Reverse proxy log files.** Details of load balancing and proxy server activity for HTTP and HTTPS connections are logged to the Apache log files in the /opt/SUNWsgdg/httpd/httpd-2.2.9_openssl-0.9.8g_gateway/logs directory on the SGD Gateway host.
- **SGD server log files.** Each SGD server in the array writes error messages to log files in the /opt/tarantella/var/log directory on the SGD server host. See "Monitoring" in Chapter 6 of the *Sun Secure Global Desktop 4.5 Administration Guide* for more details about configuring logging for SGD servers.

Displaying SGD Gateway Process Information

When you start the SGD Gateway, the process ID of the routing proxy is stored to the /opt/SUNWsgdg/proxy/var/run/proxy.pid file on the SGD Gateway host.

The process ID of the reverse proxy is stored to the /opt/SUNWsgdg/httpd/httpd-2.2.9_openssl-0.9.8g_gateway/logs/httpd.pid file. This file location can be changed using the PidFile directive in the httpd.conf Apache configuration file.

To display the running SGD Gateway processes, use the following command on the SGD Gateway host:

```
# ps -ef| grep SUNWsgdg
```

Checking the Configuration From the Command Line

You can use the following commands to check your SGD Gateway configuration.

- gateway status – Shows status information for the SGD Gateway.

  Run the following command on the SGD Gateway host:

```
# /opt/SUNWsgdg/bin/gateway status
```

  See also “gateway status” on page 40 for more information about this command.

- tarantella gateway list – Displays a list of the SGD Gateways that are authorized for use by the SGD array.

  Run the following command on any SGD server in the array:

```
# tarantella gateway list
```

  See “The tarantella gateway Command” on page 49 for more details about using the tarantella gateway command.

- tarantella config list – Displays global settings for the SGD array.

  Run the following command on any SGD server to show the --security-gateway attribute setting. This attribute determines which SGD Clients are allowed to use the SGD Gateway.

```
$ tarantella config list --security-gateway
```

See "The --security-gateway Attribute" on page 53 for more details about this attribute.

SGD Gateway Error Messages

SGD Gateway error messages are reported to the routing proxy log files, located in the /opt/SUNWsgdg/proxy/var/log directory on the SGD Gateway host.

Some typical SGD Gateway error messages, along with an explanation of the probable cause, are listed in the following table.

Error Message	Probable Cause

`Failed to validate token:`
`Token time not yet valid`
	The clocks on the SGD Gateway and the SGD servers in the array are not synchronized

`Failed to decode token:`
`No trusted signature found`
	The CA certificate for the SGD server has not been installed on the SGD Gateway

`Failed to validate token:`
`No recipient available to decrypt token`
	The SGD Gateway certificate has not been installed on the SGD array

`SSL error:`
`Check the proxy SSL keystore has valid trusted certificates`
	The SSL certificate for the SGD server has not been installed on the SGD Gateway